

## **River Mile 10.9 Operations and Maintenance Plan**

### **EPA Responses (May 1, 2014) to CPG Comments (March 31, 2014) on the QAPP draft Worksheet #9 (January 22, 2014)**

EPA reviewed the draft Quality Assurance Project Plan worksheet referenced above. In response, we offer the following:

1. Objectives for Performance Monitoring of the RM 10.9 Cap
  - a. Demonstrate physical stability of the cap (not under discussion here)
  - b. Demonstrate chemical stability of the cap (focus of these comments)

**CPG Comment** - The RM 10.9 Removal Action was implemented to reduce the risk associated with the direct contact exposure to sediments by people due to elevated concentrations of COPCs in RM 10.9 surface sediments. The cap physically prevents direct contact to underlying sediment by river users. As an added benefit an active layer was included to further enhance the protectiveness of the cap. In the near term, the surface of the cap is likely to be recontaminated by sediment deposition which is likely to be in the low 100s of ppt of TCDD – two orders of magnitude less than the pre-dredge surface of the RM 10.9 Removal Area. The CPG does not agree with Region 2's rationale for an aggressive short-term chemical monitoring program of the RM 10.9 cap. It is unnecessary to evaluate the short-term effectiveness of the cap to chemically isolate COPCs when the primary goal of the Removal Action and the construction of the cap were to remove and reduce the direct contact risk due to the presence of elevated concentrations in the surface sediment.

On the Hudson River, Region 2 requires monitoring of the Phase 2 engineered caps for physical integrity and chemical isolation effectiveness. The chemical isolation effectiveness monitoring will occur in designated sentinel areas 10 years after completion of cap construction in those areas and then at 10-year intervals, or as soon as practical after a flood event exceeding the design recurrence interval for those caps.. For Onondaga Lake long-term monitoring of the cap includes routine physical and chemical monitoring which is anticipated to occur 5, 10, 20, and 30 years after construction begins. For the Lower Passaic River Study Area, EPA has required no chemical monitoring at the Lister Avenue Phase 1 Removal Action site. Region 2's requirements for the RM 10.9 Removal Area are completely inconsistent with the chemical monitoring requirements for frequency and schedule established at other Region 2 capping sites such as the Hudson River and Onondaga Lake.

The CPG believes that only physical monitoring is sufficient and required to monitor the effectiveness and integrity of the cap. If the RM 10.9 cap is similar and consistent to that implemented as any final remedy for the LPRSA, then the need for long-term chemical monitoring for the cap should be determined as part of the overall LPRSA long-term monitoring plan and regular 5 year reviews. This appears to be the rationale developed for the Hudson River and Onondaga Lake and should apply to the RM 10.9 Removal Action as well.

**EPA Response:** The cap is designed to isolate the contaminants in sediments underlying the cap from surface water and biota exposed to surface sediments. The proposed monitoring evaluates whether that objective has been achieved. The monitoring requirements at other sites and operable units referenced in your comment are not relevant to this discussion. They have been instituted for other purposes and there are site-specific differences.

The provided approach is not unprecedented. The proposed application at RM10.9 is consistent with its highest use which is cap performance monitoring - is the cap isolating contaminants in the underlying sediments as intended?

Vertically-installed passive samplers to evaluate pore water contamination have been installed at numerous capping sites throughout the country, such as:

- Anacostia River (Washington DC)
- McCormick and Baxter Portland Harbor Site (Portland, OR)
- Tennessee Products (Chattanooga, TN)
- Pacific Sound Resources (Seattle, WA)
- Wyckoff/Eagle Harbor Site (Bainbridge Island, WA)
- San Jacinto River Waste Pits (Baytown, TX)
- Roxana Marsh (Hammond, IN)

These sites have had multiple deployments of the samplers and have analyzed samples for PAHs at all except San Jacinto River, where samples were analyzed for dioxin.

## 2. Objectives of Pore Water Monitoring

- a. Verify the cap is performing as expected by monitoring 3 zones of the capped sediment
- b. Determine the influence of both underlying sediment concentrations and overlying water concentrations on the cap and cap performance

**CPG Comment** - CPG is not aware that Region 2 has required Tierra/Maxus/Occidental (TMO) to evaluate the impact of overlying surface water concentrations and sediment deposition on the Phase 1 backfill area. Since Region 2 has identified backfill as a potential post dredging measure among its FFS alternatives, it is unclear and appears inconsistent as to why Region 2 is requiring evaluation of this parameter for the RM 10.9 engineered cap while the same has not been required for the backfill of the Phase 1 Removal Area.

**EPA Response:** Monitoring requirements referenced in your comment are not relevant to this discussion.

- c. Evaluate the relative difference between the 3 layers

**CPG Comment** - There are multiple reasons that could be causing the differences including post capping deposition of contaminated sediments on the surface – (which has no bearing on the effectiveness of the cap); residuals within the active sand layer and the least of which is transport through the actives and layer in the short time envisioned by Region 2 for this monitoring program. As envisioned by Region 2 – this sampling program will not resolve and identify those possible reasons for detections of COPCs in or above the cap's active layer.

**EPA Response:** A temporal evaluation of concentration changes through the cap profile elucidates processes responsible for contamination.

### 3. Locations and Frequency of Sampling

#### a. Focus on monitoring 3 depth zones of the capped sediment:

- i. Contaminated layer beneath cap – to determine baseline conditions
- ii. Active carbon layer – to determine if breakthrough is occurring (1 or 2 samples)

**CPG Comment** - The COPCs are unlikely to be breaking through the active layer in the next five years and it is unlikely that this would be observable for at least 100 years and up to 250 years based on the CAPSIM model predictions.

**EPA Response:** This testable hypothesis should be verified. If short term performance is verified, monitoring will transition to a longer time frame.

- iii. Within the armor stone layer – to measure the influence contamination in the water column is having on the cap

**CPG Comment** - See previous comments.

**EPA Response:** See previous responses.

#### b. Divide the capped area into at least 4 sections, based on criteria such as

- i. Thickness of cap placed

**CPG Comment** - There are only minor differences in active layer thickness – what are the criteria for selecting different categories? Moreover, the areas where the thickness of active layer is reduced are characterized by underlying substrates of hardpan, rocks, rip-rap and native material where the potential for remaining contaminated sediment is minimal.

**EPA Response:** The criteria reflect cap conditions and environmental/chemical processes that are known to affect cap performance. Areas should be differentiated on the basis of the variation in relevant criteria. Specific values should be derived from an analysis of site data.

With respect to underlying substrates of hardpan, rocks, and rip rap, these types of substrates have a well-documented propensity to harbor ample contaminated material (consider Grasse River, NY; Bradford Island, OR; Manistique Harbor, MI; Cumberland Bay, NY).

- ii. Groundwater influx/upwelling

**CPG Comment** - What is Region 2's criteria for differentiation of areas?

**EPA Response:** See response to 3(b)(i)

- iii. No-dredge zone potential edge effects on capped areas flanking this zone

**CPG Comment** - Region 2 has not required TMO to evaluate edge effects in the Phase 1 back fill adjacent to the undredged Phase 2 areas. Why is the evaluation of edge effect critical to evaluating the effectiveness of the RM 10.9 cap adjacent to non-dredge areas but not the boundary of the dredged Phase 1 area and Phase 2 areas and other undredged areas at Lister Ave and in Harrison Reach?

**EPA Response:** Decisions at other operable units relating to backfill are not relevant to establishing cap performance at RM 10.9.

iv. Bathymetry

**CPG Comment** - What is Region 2's criteria?

**EPA Response:** See response to 3(b)(i)

- c. Select at least 5 discrete locations within each section to monitor
  - i. a minimum of at least 20 sampling locations across the cap must be monitored

**CPG Comment** - CPG believes Region 2's recommended number of locations is excessive, unneeded and inconsistent with other long-term monitoring plans implemented at other Region 2 dredging projects such as the TMO Phase 1 removal and the Hudson River project.

**EPA Response:** It is not apparent what the CPG's criteria and rationale is for "excessive." Increased sample size increases confidence that the cap is being monitored at a resolution capable of establishing cap performance. If great variability is seen in results, greater density may be needed. If low variability is seen in results, lesser sampling density may be warranted.

- ii. the number of locations will increase if more than 4 distinct areas are identified

**CPG Comment** - What is the criteria for identifying addition areas?

**EPA Response:** See response to 3(b)(i)

- d. Collect samples 3 times within the first 5 years – sample during the season when the highest degree of upwelling would be expected

**CPG Comment** - What is EPA's basis for sampling frequency? Porewater concentrations are unlikely to show any changes in 1-5 years. What are requirements for QA/QC samples, duplicates, splits etc.?

**EPA Response:** The timeframe is constrained primarily by a project-specific need for information. Three sampling points is the minimum needed to establish a trend. Five years represents a short-term monitoring timeframe to support near-term decisions, while permitting biannual (yr 1,3,5) instead of annual sampling (yr 1,2,3). That increment increases the time over which processes are monitored. Information from this time frame will be used to establish long-term monitoring requirements.

- e. This plan will result in the analysis of 60 to 80 samples 3 times prior to evaluation, for a total number of samples of 180 to 240

**CPG Comment** - This number of samples required by Region 2 for a 5 acre cap appears to be excessive with no clear cut data quality objectives established.

**EPA Response:** Again, is unclear what the basis is for an "excessive" determination. The alternate view is that this sample size is the bare minimum to establish cap performance. DQOs and the project QAPP will be written by the Settling Parties. The basic elements of DQO requirements have been articulated in written and verbal correspondence.

#### 4. Parameters to Analyze

- a. Use PAHs as an indicator contaminant class at all locations
- b. Analyze at least 4 locations for dioxins and PCBs as well

**CPG Comment** - Is this required for all 3 events envisioned by Region 2 at all three depths?

**EPA Response:** Yes

- i. to verify efficacy of using PAHs as a surrogate

**CPG Comment** - How does the Region propose to evaluate this?

**EPA Response:** Through detection of PAHs at concentrations in the native sediment bed that are high enough to be reliably measured and constitute a source of PAHs to pore water and comparison to dioxin concentrations where measured.

- ii. select locations based on areas with the highest underlying dioxin concentrations

#### 5. Performance Standards

- a. Trigger location will be the upper portion (i.e., upper 1/3) of the active layer

**CPG Comment** - It is unclear why the upper layer would be the trigger - this portion of the cap is most affected by surface water and deposition.

**EPA Response:** The conceptual cap model is that concentrations below the cap are greater than those depositing on the cap, so those concentrations (if they ever could get to the upper 1/3 of the active layer) would be lower than any trigger value. The concern restates the need to monitor the armor layer along with the other layers so that contaminant concentrations associated with deposited material/surface water are understood and can be placed in context with concentrations within the cap and the native layer. The trigger location could also be the lower layer. That location could be considered an early warning indicating saturation of the cap's ability to sequester contaminants.

- b. Trigger concentration should be based on modeled pore water concentrations predicted by the CapSim model

**CPG Comment** - Since CAPSIM does not predict break through for at least 100 years, it is unclear whether this is an unambiguous, appropriate or even measureable trigger for short term monitoring program in years 1-5.

**EPA Response:** CAPSIM is used to model performance. The concentrations are only as unambiguous, appropriate, and measurable as is the output from the selected model. It appears to be a contradiction that the model can be used to unambiguously assert the cap will be effective, but the concentrations projected by the model can't be used to measure effectiveness.

- c. Consider collecting samples from both the bottom third and upper third of the active layer to further inform results

**CPG Comment** - The dredged surface was well-characterized in the RM10.9 pre-design investigation and at Region 2's directive extensively resampled at the conclusion of the dredging. Characterizing the bottom of the active layer is unnecessary. CPG Comments 1 and 3 address sampling the upper third of the active layer.

**EPA Response:** Sampling within the active layer establishes the performance of the active layer and is therefore necessary.

Perhaps this comment is supposed to say "Characterizing below [not "the bottom of"] the active layer is unnecessary"? It seems that's the case because of the text re: post-dredging sediment concentrations. Extrapolated sediment concentrations do not provide pore water concentrations at a specific location. The native sediment concentration is necessary to establish what contaminants at what concentrations will affect the performance of the cap at the location of sampling.

- d. Note that the CapSim model will need to be revisited to provide concentration estimates for the years when monitoring will occur, and may need to be revisited to provide upper bound estimates.

## 6. Methods for Pore Water Measurement

- a. Recommend using SPME fiber-pushpoint sampler approach (modified Henry sampler)
- b. Can penetrate through all 3 layers and analyze fibers at appropriate intervals
- c. Placement techniques for the SPMEs can be achieved through engineering
- d. Verify with labs that appropriate detection limits can be achieved

**CPG Comment** - CPG has concerns about advancing numerous sampling devices into the engineered cap.

**EPA Response:** The samplers have approximately the diameter of a pencil. A proposed sample number of 20, would represent about 6 cm<sup>2</sup> over 5 acres. Further, it is expected that upon withdrawal of the sampling device, any "hole" would collapse and refill with active material.